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Cannabis, hemp and CBDs

new ingredients for the soft drinks industry?

If you mention the word cannabis most people think of a herb that you smoke to become high, but recent research is turning this notion on its head. If you persist through the clouds of smoke, hype and misinformation about whether cannabis has other medicinal properties apart from making you ‘high’, it appears that cannabis does indeed have some legitimate health and pharmaceutical uses. New research findings coupled with entrepreneurship, innovation and an understanding of the nutraceutical industry are creating a new plethora of legal cannabis based health food and drink products but without the psychoactive effects so often associated with the ingestion of cannabis.

Dr John Wilkinson digs below the hype surrounding the otherwise taboo herbs, to reveal their functional benefits, and how they might be adopted into the mainstream in due course.

Cannabis: from drug of abuse to legitimate pharmaceutical drugs

So what has caused the shift from the use of cannabis as ‘Marijuana’ for getting high to being used as a legal pharmaceutical and nutraceutical? The use of cannabis goes back as far as 4,000 years and in the Western world it was prescribed by doctors for pain relief and epilepsy in the 1800s. Later on, its use was questioned and it was subsequently banned, for example in the UK in 1928 as part of the new dangerous drug act, and doctors finally stopped prescribing it for pain relief in 1971. It was replaced by injectable pain relieving medicines, and this, coupled with the increasing use of cannabis as a recreational mind altering drug during the 1960s by the hippie counter culture, led to its demise for use in medicine.

However, advocates for the legalisation of cannabis continued raising awareness of its benefits not only as a recreational drug but also for its use in pain relief, easing of muscle spasms and a whole plethora of other uses – so many, in fact, that the scientific community became very suspicious of any genuine use in health products and pharmaceuticals, apart from making you high.

In the late 1990s two scientific entrepreneurs, Dr Geoffrey Guy and Dr Brian Whittle, formed GW Pharmaceuticals and began to develop the first latter day, legal form of cannabis for use as a pharmaceutical drug. Their reputation for developing innovative plant based medicines was borne from their previous company Phytopharm where they successfully raised millions for developing pharmaceutical versions of herbal medicines.

Armed with their experience and raising millions of pounds to fund the research, within 10 years they were successful in registering the first legal version of cannabis for use as a pharmaceutical drug. Their company has been a leader for the scientific substantiation of the use of cannabis in medicine and also for producing standardised extracts that could ultimately, through the rigorous regulatory system, be approved as a legal drug in the 21st century.

Chemical constituents of cannabis

Cannabis is known to contain over 400 compounds of which more than 60 have been identified as cannabinoids, a specific class of phytochemicals and many of which are unique to cannabis. Two main classes of these compounds have received most interest by researchers: the psychoactive Tetrahydrocannabinol (THC) and until recently, the seemingly inactive cannabidiols (CBDs).

Research over the past few decades has now shown that CBDs display very important biological activity that can potentially be applied and used in a variety of functional food and pharmaceutical products but without the psychoactive properties of THC. Consequently, new product development in the use of cannabis has begun to focus more on increasing the CBD content of...
cannabis, while lowering the content of the psychoactive THC. By lowering or removing the THC ‘high’ from ingesting cannabis, its use has a much wider appeal with consumers seeking, for example, pain relief but without wanting the psychoactive effects when ingesting cannabis. By lacking any significant levels of THC, this creates at the same time a pathway for legally ingesting cannabis.

CBD versus THC-containing cannabis
In the early days of cannabis research, THC was the most investigated compound as researchers tried to unravel its unique pharmacological and psychoactive actions. However, other chemotypes of cannabis (based mainly on the species, *Cannabis sativa*) were known which contained very little THC and therefore could not make you ‘high’ if you smoked the dried leaves and accordingly these chemotypes were often refereed to as hemp rather than cannabis.

Hemp cultivation produces high plants with long stems which are harvested and the resulting fibres are used for making rope. The seeds are also used and are crushed to produce hemp oil for food and cosmetic uses. In recent years hemp has begun to be used to make a host of cannabis based clothes and more lately, cannabis based drinks. Although the taxonomical differences between hemp and cannabis are not significant, the content of THC and CBD is very different, with typically minute amounts of THC and CBD being found in hemp compared to THC rich cannabis.

This type of low THC containing cannabis (hemp) has led many governments to define ‘legal, non pharmaceutical’ cannabis as containing less than 0.3% THC with no maximum content of CBDs stated.

Biological activity of CBD
Recently there is growing evidence that CBDs, originally considered by pharmacologists as ‘inactive’, have been found to display important biological activity and these new discoveries are helping to pave the way for a new group of medicines based on CBDs. For example, they have been shown to slow down cancer cell proliferation and to relieve the symptoms of anxiety and stress, reduce symptoms related to Parkinson’s disease, schizophrenia, epilepsy, and have potent anti-inflammatory effects, reducing pain and muscle spasms among other potential uses.

The use of hemp as a nutraceutical
The benefits of non-THC containing CBD extracts are being utilised in the pharmaceutical industry, but are also being used as nutraceuticals for use in food and drink products. This is because non-THC containing cannabis (hemp) can be considered as a food rather than as a medicine or an illegal drug, in the EU, USA and elsewhere.

Pharmaceutical and nutraceutical products on sale
Since research has shown that CBDs display a variety of biological activities, this has now been the driving force for a number of companies to develop CBD rich hemp based nutraceutical and pharmaceutical products.

For example, Sativax has been approved as a cannabis based pharmaceutical drug for pain relief in cancer patients and for use with multiple sclerosis spasticity. Sativax, produced by GW Pharmaceuticals, is only available on prescription and contains a mixture in approximately equal proportions of THC and CBD.

In the nutraceutical sector, CBD rich extracts are being produced by cold pressing hemp seeds, supercritical carbon dioxide extraction of the whole hemp plant and also by juicing hemp leaves without the use of solvents.

Cold pressed hemp seed oil has long been available and is used as a salad dressing, in smoothies and juicing products, although the content of CBD in these oils is generally very low. Various extraction solvents have been used including ethanol and olive oil and lately super critical extraction processes have also been explored.

For example, super critical carbon dioxide extracts containing concentrated CBDs are being produced making use of the whole hemp plant and producing an enriched CBD extract. BlueBird Botanics based in Colorado, USA produce a carbon dioxide extract that contains from 250mg to 1.5g of CBD per fluid ounce.

Another product is based on the juicing of hemp leaves, rather than using extraction technologies, and can perhaps therefore be considered the most ‘natural’ CBD hemp product available at the moment. Marco Joosten, MD of Sana Hemp Juice, based in The Netherlands stated: “We cultivate 1,600 acres of hemp in The Netherlands. Hemp juice is produced from the leaves which is then freeze dried to give a long term stable and consistent product. At present, we are the only producer of CBD rich hemp juice in the EU.” The company produces a product where the CBD content is 54mg per 100ml of product. The recommended intake based on data from producers’ websites, is around 5mg per day.

Quality control and regulatory status
The pharmaceutical versions of CBD have to adhere to strict quality controls to be produced as approved pharmaceutical drugs. At present this results in a product that is relatively very expen-

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Dr Wilkinson is a Phytochemist and Pharmacognosist and an expert in the regulatory approval of supplements and novel foods. He has been a consultant on the regulatory approval of natural products in the EU and the USA for over 20 years. He also established the world’s first Herbal Medicine BSc degree in Herbal Medicine in the UK in 1994 where he was Senior Lecturer in Pharmacognosy and Phytochemistry.

Prior to this he was awarded the prestigious SERC NATO postdoctoral research fellowship and worked with the Nobel Prize winner George Olah in California, USA, after obtaining his PhD in Organic Chemistry at Imperial College, London.

He provides regulatory advice to companies from targeted one hour teleconferencing problem solving sessions to full dossier submissions for novel foods, supplements, food additives, health claims and labelling. He also undertakes new product development specialising in natural product derived ingredients and is a specialist writer on new ingredients in the natural products industry.

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